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# Medical Technology

## DANB-RHS

### Radiation Health and Safety Exam



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## Question: 1

During panoramic positioning of the patient, if the patient's chin is positioned too low, the following will be seen on the processed radiograph:

- A. a smile line curved downward.
- B. open contact on the posterior teeth.
- C. detail in the anterior apical regions.
- D. the absence of the patient's condyles in the correct anatomical position.

**Answer: D**

Explanation:

During panoramic positioning of the patient, if the patient's chin is positioned too low, the patient's condyles are not shown in their correct anatomical position. Often, the borders of the ramus and condyles, bilaterally, are seen as being distorted in width and seemingly higher in the cranial cavity than they should be as related to the correct anatomical position of such landmarks.

## Question: 2

Which of the following is a correct characteristic of the developing solution?

- A. The developer removes any non-energized silver bromide crystals from the image receptor.
- B. The developer solution reduces the silver bromide crystals to black metallic silver.
- C. The developer solution causes the radiopaque areas on the image receptor to appear.
- D. The developer solution hardens the protective layer of the image receptor covering the emulsion.

**Answer: B**

Explanation:

The developer solution is responsible for softening the outer protective layer of the image receptor in order to reach the energized emulsion crystals. The developer then reduces the silver bromide crystals into black metallic silver crystals and the image receptor is then ready for the fixer solution. Because of this reaction, the developer solution is said to create the radiolucent areas on an image receptor.

## Question: 3

When considering the use of standard duplicating film, which of the following is correct?

- A. The process of film duplication must occur in the darkroom.

- B. Duplicated images may only be given to the patient because their quality is too poor to send on to a specialist.
- C. Only a small amount of additional radiation is needed to produce a duplicated image.
- D. The duplicating film is covered with emulsion on both sides, which decreases the amount of time needed to complete the duplication process.

**Answer: A**

Explanation:

When the dental auxiliary is considering film duplication, this is an activity that must take place in the darkroom. If it is done in an area where there is white light, the resulting duplicated images will appear black. There is no additional amount of radiation exposure that is needed when duplicating image receptors. There is special film that needs to be used when performing this process, which contains emulsions only on one side compared with conventional film that contains emulsion on both sides.

### **Question: 4**

All of the following statements regarding the somatic effect of radiation are TRUE, EXCEPT:

- A. Damage caused by radiation from somatic effects is passed on to future generations.
- B. X-rays can damage somatic tissues.
- C. One possible somatic effect of radiation is cancer.
- D. X-rays affect somatic cells.

**Answer: D**

Explanation:

The only statement that is false in this series of statements is "Damage caused by radiation from somatic effects is passed on to future generations." This statement is false. Dental x-rays are capable of harming somatic tissues and cells, which may result in cancer, but this harm is not inheritable to future offspring.

### **Question: 5**

Which of the following is an accurate description of ionization?

- A. The pairing of electrons and protons to create ions.
- B. The creation of stable atoms due to radiation striking the nucleus of an ion.
- C. The process of particulate radiation striking a cell and destroying the DNA of that cell.
- D. The process of converting stable atoms into ions.

**Answer: D**

Explanation:

Ionization is the process in which stable atoms are disrupted by radiation and ions are created. Ions are charged particles and include the negative electrons that can be ejected from a stable atom after it is struck by radiation.

## Question: 6

Tomography can be best described as:

- A. the production of a clear, crisp image.
- B. the process of imaging a desired structure while blurring of other areas.
- C. the production of a blurred image.
- D. a second name for the production of periapical images.

**Answer: B**

Explanation:

Tomography can be described as the process of imaging a desired structure while blurring other areas on an image. This is how panoramic images are produced as well as other types of extraoral projections.

## Question: 7

In an automatic processor, which solution(s) must be kept at a temperature between 80 and 95 degrees?

- A. The water bath.
- B. The fixer solution.
- C. The developer solution.
- D. The fixer and developer solutions.

**Answer: C**

Explanation:

In an automatic processor, the developer solution must be kept at a temperature between 80 and 95 degrees. This increase in temperature allows for the exposed radiograph to be developed much more rapidly than if the solutions were kept at a cooler temperature. Cooler temperatures of the developing solution of the automatic processor will have a direct effect on the resulting radiograph, making it of no diagnostic value. The probe that is often found in the automatic processor developing solution tank should be closely monitored to keep the developing solution at the required temperature.

## Question: 8

A dental x-ray that has the appearance of black lines that look like a tree branch is caused by:

- A. Overlapped films
- B. Static electricity

- C. Overexposure
- D. Air bubbles

**Answer: B**

**Explanation:**

Black, tree-like branches that appear on x-ray images are usually due to the presence of static electricity. There are ways to help prevent static electricity from damaging film. The operator opening the film package should touch a metal object first to discharge the static electricity. The film packages should be opened carefully and slowly. The humidity in the developing room should be adjusted to 30% to 50% humidity. A humidifier can be used as needed. Proper uniform selection is also helpful to reduce the chances of static electricity. Synthetic materials tend to attract static. The placement of rubber mats in the work area will also help.

### **Question: 9**

Which statement best describes the effects of long-term low-dose radiation exposure?

- A. The effect of long-term low-dose radiation exposure will cause genetic defects for both men and women in their childbearing years
- B. The effect of long-term low-dose radiation exposure will cause cancer
- C. The effect of long-term low-dose radiation exposure can cause changes at the cellular level in the human body that would be observed within 2 years
- D. The effect of long-term low-dose radiation exposure can cause changes at the cellular level in the human body that would not be observed for many years

**Answer: D**

**Explanation:**

About half of radiation exposure in the United States occurs because of medical procedures such as x-rays, CT scans, or other types of procedures. Low doses of radiation do not cause an immediate medical or genetic effect. The effects of long-term low-dose radiation exposure are typically not seen for 5-20 years and may manifest as changes in the cellular level in the human body. The main concerns for radiation exposure are cancer and genetic defects. The chances for either to occur are possible but are less likely to occur from low-dose exposure.

### **Question: 10**

The difference between acute radiation exposure and chronic radiation exposure is:

- A. the type of radiation received.
- B. the type of scattered radiation received.
- C. the amount of radiation received and the time frame in which it is absorbed.
- D. the type of wavelengths creating the exposure

## Answer: C

### Explanation:

The difference between acute and chronic radiation exposure is the amount of radiation received and the time frame in which it is absorbed. In acute radiation exposure, a large or very high amount of radiation is exposed over a short period of time. This can lead to serious illness. Chronic radiation exposure is an unspecified amount of exposure over a long period of time. The amount of exposure and the overall length of time that the exposure was given will determine if it will cause a lasting effect.

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